CLAIMS:

1. A method for fabricating a substantially transparent polymer substrate for an anti-scatter x-ray grid for medical diagnostic radiography, the method comprising:

positioning a phase mask between the substrate and a high power laser;

providing a laser beam from the laser;

conditioning the laser beam;

ablating a first portion the substrate through the phase mask with the conditioned laser beam;

moving one of the substrate and the laser; and

ablating a second portion of the substrate through the phase mask with the conditioned laser beam.

2. The method of claim 1 wherein ablating comprises forming an opening which extends completely through the substrate.

3. The method of claim 1 wherein the substrate comprises a polymer.

4. The method of claim 3 wherein ablating a first portion of the substrate comprises ablating the substrate so as to provide a slope less than or equal to about 0.25 degrees.

5. The method of claim 1 further including positioning an objective lens between the phase mask and the substrate.

6. The method of claim 1 wherein ablating the first and second portions of the substrate includes forming a complex pattern of ablated portions of the substrate.

7. The method of claim 1 wherein ablating the first and second portions of the substrate includes forming a pattern of ablated portions of the substrate designed to match a pattern of an image detector with which the anti-scatter x-ray grid can be used.

8. The method of claim 1 wherein ablating the first and second portions of the substrate includes forming a pattern of ablated portions of the substrate designed to optimize utilization of the laser beam.

9. A method for fabricating an anti-scatter x-ray grid for medical diagnostic radiography, the method comprising:

positioning a phase mask between a substantially transparent substrate and a high power laser;

providing a laser beam from the laser;

conditioning the laser beam;

ablating a first portion the substrate through the phase mask with the conditioned laser beam;

moving one of the substrate and the laser;

ablating a second portion of the substrate through the phase mask with the conditioned laser beam; and

filling the ablated portions of the substrate with a substantially absorbent material; and

removing additional areas of substrate material.

10. A system for patterning a substantially transparent polymer substrate of an anti-scatter x-ray grid, the system comprising:

a high power laser for providing laser light;

a beam homogenizer for conditioning the laser light;

a phase mask for creating a pattern of the conditioned laser light while reducing an amount of the conditioned laser light which is lost to the phase mask;

a movable table for supporting the substrate and moving the substrate so that different areas of the substrate can be exposed to the pattern of the conditioned laser light.

11. The system of claim 10 further including an objective lens for focusing the pattern of conditioned laser light on the substrate.

12. The system of claim 11 wherein the objective lens comprises an axial gradient-index lens.

13. The system of claim 11 wherein the focused pattern of conditioned laser light is capable of forming openings at least partially through the substrate having a slope less than or equal to about 0.25 degrees.

14. The system of claim 13 wherein the focused pattern of conditioned laser light is capable of forming openings which extend completely through the substrate.

~~15. The system of claim 11 wherein the focused pattern of conditioned~~ laser light is capable of forming a complex pattern of ablated portions of the substrate.

16. The system of claim 11 wherein the focused pattern of conditioned laser light is capable of forming a pattern of ablated portions of the substrate designed to match a pattern of an image detector with which the anti-scatter x-ray grid can be used.

17. The system of claim 11 wherein the focused pattern of conditioned laser light is capable of forming a pattern of ablated portions ~~of the substrate~~ designed to optimize utilization of the laser beam.